B. Copending Applications

Section 1 on page 2 of the Office Action indicates that copending applications listed in information disclosure statements should be listed in the specification if they are to be used as references. Applicant does not intend that the copending applications be used as references, but wishes to bring the copending applications to the attention of the Examiner pursuant to the first sentence of the third paragraph of MPEP 2001.06(b).

Section 5 on page 2 of the Office Action requests serial number and present status of a copending application listed on page 31, line 15 of the specification. In response, applicant has made the requested amendments.

C. Objection to Drawings

Section 3 on page 2 of the Office Action objects to the drawings as failing to show the asymptotic line set forth in claims 14 and 48. Applicant has been unable to find any limitation to an asymptotic line in claims 14 and 48. Applicant notes, however, that claims 14 and 48 are each limited to displacements that define an ***asymptotic path***. This feature is clearly shown in Figs. 4A and 5, in each of which the displacements between viewpoint positions define a path that is asymptotic with respect to a point of interest (POI), as described at page 21 first paragraph and in the last sentence of the third paragraph on page 22. In addition, asymptotic paths appear in boxes 186, 188, and 192 in Fig. 8; in boxes 402 and 404 in Fig. 13; and in box 442 in Fig. 14.

Applicant proposes to correct two errors in Fig. 14 as shown in red on the sketch with the enclosed Request for Approval of Drawing Correction. Applicant respectfully requests that the Examiner indicate approval of the proposed drawing corrections in the next Office Action.

In view of the Request for Approval of Drawing Correction and the above remarks, applicant requests that the objection to the drawings be withdrawn.

D. Abstract

Section 4 of the Office Action reminds applicant of the proper language and format of an Abstract. In response, applicant has deleted three sentences of the Abstract to bring it below 250 words in length.

E. Inventorship

Applicant has noted an error in the Corrected Filing Receipt. The Corrected Filing Receipt shows the name "Jock D. Mackinlay", which should be changed to --Jock Mackinlay-- as shown on the Declaration and Power of Attorney and on the original Filing Receipt. Applicant requests that the Examiner confirm in the next Office Action that the error has been corrected in the records of the U.S. Patent and Trademark Office.

F. Power of Attorney

Applicant submits herewith an Associate Power of Attorney, requesting that the undersigned, James T. Beran, Registration No. 31,090, be recognized as an Associate Attorney.

G. Indefiniteness Rejection

Section 6 on page 2-3 of the Office Action rejects claims 10-27 and 42-51 under 35 U.S.C. 112, second paragraph as indefinite.

The first ground of rejection is the phrase "second region being perceptible as a displaced continuation of the first region" in claim 10. This phrase can be clearly understood from the explanation at page 15 second paragraph. The phrase means that the first region is perceptible as being displaced within the three-dimensional workspace set forth at claim 1 line 9. An example of this technique is described at page 8 last paragraph-page 9 first paragraph.

The second ground of rejection is that it is unclear what the steps or sequence of steps are in claims 11, 42, 46, and 48. These limitations can be

understood with respect to Figs. 3 and 10, each of which shows a loop. In Fig. 3, one step could be read on boxes 30 and 32, another on box 34 and the first occurrence of box 36, and others on iterations of the loop, with each iteration including box 38 followed by box 36. In Fig. 10, a step could be read in several ways: For example, a step could be read on each iteration of the loop that begins with box 262 and ends with box 260; on each iteration of the loop that begins with box 272 and ends with box 270; or on each iteration of the loop that begins with box 284 and ends with box 280.

In Fig. 3, a sequence of steps could therefore be read on the sequence that includes a first step in boxes 30 and 32, a second step in box 34 and the first occurrence of box 36, and third and subsequent steps in iterations that include box 38 followed by box 36. In Fig. 10, a sequence of steps could similarly be read on iterations of any of the loops set forth above.

A substep could accordingly be read on an act performed within a step, such as the acts in box 36 in Fig. 3, which are substeps of the step that includes box 34 and the first occurrence of box 36 and are also substeps of the step that includes box 38 followed by box 36.

The third ground of rejection is that the term "next preceding step" is vague and indefinite in claims 11, 13, 16, 17, 19, 20, 23-26, 42-44, and 46-49. This term can be understood from the following definition of "next" in *The American Heritage Dictionary*, Second College Edition, Boston: Houghton Mifflin, 1982, p. 840: "**2.** Immediately preceding or following in time, order, or sequence". From this definition, it is clear that a step's "next preceding step" means the step that immediately precedes it in a sequence of steps.

Applicant requests that the Examiner withdraw the rejection under 35 U.S.C. 112, second paragraph, in view of the above remarks.

H. Prior Art Rejections

Section 8 on pages 4-7 rejects claims 1-5, 10-23, 25-34, 37, and 42-62 under 35 U.S.C. 103 as unpatentable over Waller, US-A 4,734,690, in view of Cawley, US-A 5,103,217. Section 9 on pages 7-8 rejects claims 6-9, 24, 35, 36, and 38-

41 under 35 U.S.C. 103 as unpatentable over Waller and Cawley in further view of an article by Colin Ware and Steven Osborne entitled "Exploration and Virtual Camera Control in Virtual Three Dimensional Environments" ("Ware et al.").

Applicant respectfully traverses the prior art rejections.

Claims 1 and 11:

Waller, Cawley, and Ware et al. all fail to teach or suggest the following features in claims 1 and 11:

Claim 1 is limited to a method that presents a first image that includes a first surface, "perceptible as viewed from a first viewpoint within a three-dimensional workspace." The method also receives "a first region indicating signal and a first motion requesting signal from the user input device; the first region indicating signal indicating a first region on the first surface; the first motion requesting signal requesting viewpoint motion relative to the first region." Finally, the method presents a second image that includes a second surface, "perceptible as a continuation of the first surface viewed from a second viewpoint within the three-dimensional workspace, the second viewpoint being displaced" from the first viewpoint "in accordance with the first motion requesting signal."

Claim 11 is limited to a method that includes a sequence of steps. Each step presents an image that includes a surface "perceptible as being viewed from a respective viewpoint within a three-dimensional workspace." Each step also receives "a respective region indicating signal and a respective motion requesting signal from the user input device; each respective region indicating signal indicating a respective region on the respective surface; each respective motion requesting signal requesting viewpoint motion relative to the respective region." Each step's surface is "perceptible as a continuation of the respective surface of the next preceding step," and each step's viewpoint is displaced from the next preceding step's viewpoint "in accordance with the respective motion requesting signal of the next preceding step."

As discussed during the interview, the invention solves a basic problem in moving viewpoint in a three-dimensional workspace, as set forth at page 3 last paragraph: Although it is frequently desirable to move the viewpoint closer to a specific target, conventional techniques do not provide an easy way for the user to obtain viewpoint motion closer to a specific target.

The invention solves the viewpoint targeting problem described above by providing appropriate viewpoint motion in response to a user signal indicating a region, as explained at page 4 first paragraph. This solution can be implemented as described at page 19 second paragraph in relation to Figs. 2A and 2B: When a user indicates point 16 in image 20 in Fig. 2A and requests viewpoint motion toward point 16, a system can respond with a sequence of images that ends in image 22 in Fig. 2B so that the user can see point 26, perceptible as a continuation of point 16, and the surrounding area in greater detail. This solution can also be implemented to provide other kinds of viewpoint motion relative to an indicated region on a surface, such as motion away from the indicated region or motion lateral to the indicated region, as described, for example, in relation to Fig. 8.

Waller, Cawley, and Ware et al. all fail to recognize the viewpoint targeting problem. Waller, rather than recognizing the problem, exemplifies it.

As discussed during the interview, Waller describes a pan mode in which a user moves a thumb wheel to change the position of a window in relation to an imaginary sphere to which the window is tangent, as described in relation to Fig. 2 at col. 3 lines 25-43. At col. 4 line 61-col. 5 line 12, Waller describes how a user can select either the pan mode or a zoom mode, each of which has submodes; one of the zoom submodes changes view movement radius (VMR). In other words, as explicitly stated at col. 5 lines 45-49, in order to examine an object more closely, the user must go through a sequence of signals, some of which indicate panning movements and others of which indicate zooming movements. This awkward approach exemplifies the viewpoint targeting problem as described above.

Because Waller, Cawley, and Ware et al. fail to recognize the viewpoint targeting problem, Waller, Cawley, and Ware et al. further fail to teach or suggest the combinations of features in claims 1 and 11 that solve it. The invention as defined in claims 1 and 11 solves the viewpoint targeting problem by providing viewpoint displacement in response to a region indicating signal indicating a region on a surface in an image. In response to the region indicating signal, this solution presents another image that includes another surface that is perceptible as a continuation of the previous image. The other surface is viewed, however, from a viewpoint that is displaced from that of the previous image relative to the indicated region.

Waller, Cawley, and Ware et al. fail to teach or suggest the claimed combinations of features of claims 1 and 11. Therefore, claims 1 and 11 distinguish patentably over Waller, Cawley, and Ware et al.

Claims 28, 42, 46, and 48:

Waller, Cawley, and Ware et al. all fail to teach or suggest the following limitations in claims 28, 42, 46, and 48:

Claim 28 is limited to a method that presents a first image that includes a first surface perceptible as viewed from a first viewpoint within a three-dimensional workspace. The first viewpoint is "positioned at a first distance from the first region." The method also receives a signal requesting viewpoint motion. The method presents a second image that includes a second surface "perceptible as a continuation of the first surface viewed from a second viewpoint." The second viewpoint is "displaced by a first displacement from the first viewpoint in accordance with the first motion requesting signal; the first displacement being a function of the first distance."

Claim 42 is similarly limited to a method in which the respective viewpoint of each following step is "displaced by a respective displacement from the respective viewpoint of the next preceding step in accordance with the next preceding step's motion requesting signal; the respective displacement of

each following step being a function of the respective distance of the next preceding step."

Claim 46 is similarly limited to a method in which "the respective displacement of the first following step including a first proportional component that is a first proportion of the respective distance of the next preceding step; the respective displacement of the second following step including a second proportional component that is a second proportion of the respective distance of the next preceding step."

Claim 48 is similarly limited to a method in which "the respective displacement of each following step being a function of the position indicated by the next preceding step's respective coordinate data such that the respective displacements define an asymptotic path."

The Office Action fails to make a *prima facie* case of obviousness of claims 28, 42, 46, and 48.

The Office Action fails to recognize the differences between claims 28, 42, and 46 and the prior art. Specifically, the Office Action does not recognize that Waller, Cawley, and Ware et al. fail to teach or suggest viewpoint displacement that is a function or a proportion of distance between a viewpoint and a region of a surface. The Office Action further fails to provide any reason that it would have been obvious to modify Waller, Cawley, or Ware et al. to overcome these differences.

At page 5 third paragraph, the Office Action implicitly recognizes a difference between claim 48 and the prior art. Specifically, Waller, Cawley, and Ware et al. all fail to teach or suggest viewpoint displacements that define an asymptotic path. But the Office Action argues that "an asymptotic path is an improvement of a mathematical interpretation which would be a routine optimization and obvious to one of ordinary skill in the art at the time of invention."

Applicant respectfully traverses this assertion because the Office Action includes no evidence to support it, and therefore it is insufficient to make a

*prima facie* case. Further, applicant reserves the right to present evidence on this issue because applicant believes that a number of persons skilled in the art were surprised at the effect achieved by an asymptotic path upon first observing a demonstration of the invention, showing that an asymptotic path would not have been obvious.

Claims 28, 42, 46, and 48 distinguish patentably over Waller, Cawley, and Ware et al.

Claims 52 and 59:

Waller, Cawley, and Ware et al. all fail to teach or suggest the following limitations in claims 52 and 59:

Claim 52 is limited to a method of operating a system that includes user input means that provides "motion requesting signals requesting viewpoint motion and point of interest motion; the user input means being structured so that the user can request viewpoint motion and point of interest motion independently." The method presents a first image that includes a first surface "perceptible as viewed from a first viewpoint within a three-dimensional workspace; the first image including a first point of interest on the first surface." The method receives a motion requesting signal set "requesting a first viewpoint motion and a first point of interest motion." In response, the method presents a second image that includes a second surface "perceptible as a continuation of the first surface viewed from a second viewpoint within the three-dimensional workspace, the second viewpoint being displaced from the position indicated by the stored viewpoint coordinate data in accordance with the first viewpoint motion; the second image including a second point of interest on the second surface, the second point of interest being displaced in accordance with the first point of interest motion."

Claim 59 is similarly limited to a system that comprises user input means that provides to a processor "motion requesting signals requesting viewpoint motion and point of interest motion; the user input means being structured so that the user can request viewpoint motion and point of interest motion

independently." The processor comprises first means for presenting a first image, second means for receiving a motion requesting signal set from the user input means, and third means for presenting a second image. The second image includes "a second surface that is perceptible as a continuation of the first surface viewed from a second viewpoint within the three-dimensional workspace, the second viewpoint being displaced from the position indicated by the stored viewpoint coordinate data in accordance with the first viewpoint motion." The second image also includes "a second point of interest on the second surface, the second point of interest being displaced in accordance with the first point of interest motion."

The Office Action fails to make a *prima facie* case of obviousness of claims 52 and 59.

The Office Action fails to recognize the differences between claims 52 and 59 and the prior art. Specifically, the Office Action does not recognize that Waller, Cawley, and Ware et al. fail to teach or suggest user input means structured so that the user can request viewpoint motion and point of interest motion independently. Therefore, Waller, Cawley, and Ware et al. also fail to teach or suggest techniques for responding to such requests as in claims 52 and 59. The Office Action further fails to provide any reason that it would have been obvious to modify Waller, Cawley, or Ware et al. to overcome these differences.

Claims 52 and 59 distinguish patentably over Waller, Cawley, and Ware et al.

Claims 2-10, 12-27, 29-41, 43-45, 47, 49-51, 53-58, and 60-62

Claims 2-10 depend from claim 1 and therefore contain all its limitations, together with additional limitations that, in combination with claim 1, further distinguish over Waller, Cawley, and Ware et al. Claims 12-27 depend from claim 11 and therefore contain all its limitations, together with additional limitations that, in combination with claim 11, further distinguish over Waller, Cawley, and Ware et al. Claims 29-41 depend from claim 28 and therefore contain all its limitations, together with additional limitations that, in combination with claim 28, further distinguish over Waller, Cawley,

and Ware et al. Claims 43-45 depend from claim 42 and therefore contain all its limitations, together with additional limitations that, in combination with claim 42, further distinguish over Waller, Cawley, and Ware et al. Claim 47 depends from claim 46 and therefore contains all its limitations, together with additional limitations that, in combination with claim 46, further distinguish over Waller, Cawley, and Ware et al. Claims 49-51 depend from claim 48 and therefore contain all its limitations, together with additional limitations that, in combination with claim 48, further distinguish over Waller, Cawley, and Ware et al. Claims 53-58 depend from claim 52 and therefore contain all its limitations, together with additional limitations that, in combination with claim 52, further distinguish over Waller, Cawley, and Ware et al. Claims 60-62 depend from claim 59 and therefore contain all its limitations, together with additional limitations that, in combination with claim 59, further distinguish over Waller, Cawley, and Ware et al. Therefore, for the reasons set forth above in relation to claims 1, 11, 28, 42, 46, 48, 52, and 59 and also because of their additional limitations, claims 2-10, 12-27, 29-41, 43-45, 47, 49-51, 53-58, and 60-62 also distinguish patentably over Waller, Cawley, and Ware et al.

Claims 63-64

In hopes of reaching a compromise of the issues with respect to claims 1 and 11, applicant submits new claims 63 and 64. Claim 63 is a version of original claim 1 that includes additional limitations that find support in original claim 2; in Figs. 8, 13, and 14 and; at page 4 first and second paragraphs, page 26 last paragraph-page 27 second paragraph, and page 35 second paragraph-page 42 second paragraph. A claim similar to claim 63 was discussed during the interview. Claim 64 is a version of original claim 11 that includes additional limitations that find support in original claim 12; in Figs. 8, 13, and 14 and; at page 4 first and second paragraphs, page 26 last paragraph-page 27 second paragraph, and page 35 second paragraph-page 42 second paragraph.

Applicant has been unable to find teachings or suggestions in Waller, Cawley, and Ware et al. of the additional limitations in claims 63 and 64. Specifically, claims 63 and 64 are further limited to region indicating signals

that indicate points and to techniques that use region indicating signals, motion requesting signals, and viewpoint coordinate data to obtain different viewpoint coordinate data indicating a position that is moved.

Claims 63 and 64 therefore distinguish patentably over Waller, Cawley, and Ware et al.

I. Other Documents and Information

Applicant submits herewith additional information of which it is aware, which it believes may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR 1.56. This is not intended to constitute an admission that any information referred to herein is "prior art" in relation to the claimed invention unless specifically designated as such. In accordance with 37 CFR 1.97(g) and (h), the filing of this Amendment With Information Disclosure Statement shall not be construed to mean that a search has been made or that the information submitted herewith is, or is considered to be, material to patentability as defined in 37 C.F.R. 1.56(b).

This Amendment With Information Disclosure Statement is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office Action on the merits, but before the mailing date of a Final Rejection or Notice of Allowance. Enclosed is a Transmittal Letter authorizing payment of the fee of $200.00 for submission of an information disclosure statement under 37 C.F.R. 1.17(p).

A list of the enclosed items is set forth on the attached one page of Form PTO-1449. The relevance of each listed item is set forth below.

Alstad et al., US-A 5,129,054, describe techniques for specifying three-dimensional points in two-dimensional graphic displays. As shown and described in relation to Figs. 3 and 4, a point on a display screen surface is selected and the screen coordinates of points of a three-dimensional shape are found by converting points of the shape to two-dimensional screen

equivalents. The converted coordinates are compared to those of the selected point to identify the shape point.

Himelstein et al., US-A 5,124,693, describe techniques for user interactive graphic display with user defined vanishing point. As shown and described in relation to Fig. 10, if a user selects a three dimensional graphic space and indicates a vanishing point using a locator device, the defined vanishing point is used in performing an action such as hidden line removal.

Chen, US-A 5,019,809, describes techniques for two-dimensional emulation of three-dimensional trackball. As shown and described in relation to Fig. 3, a reference circle is provided as a reference for user inputs provided by a 2-D input controller such as a mouse and the reference circle can enclose an object to be rotated. As shown and described in relation to Figs. 7 and 8, a computer displayed object represented in 3-dimensional form is rotated in response to dragging of a mouse pointer relative to the reference circle, with the axis of rotation and the amount of rotation being calculated using mouse pointer locations.

The Examiner's attention is also drawn to applicant's related Application Nos. 07/488,587; 07/562,048; and 07/770,196 and the claims and information submitted in relation thereto. Identification of any related application herein does not waive secrecy as to that application now or upon issuance of the present application as a patent.

J. Conclusion

In view of the above amendments and remarks, applicant requests that the Examiner reconsider this application, allow claims 1-64, indicate approval of the proposed drawing correction, enter the enclosed Associate Power of Attorney, make the enclosed items of record, and pass this case to issue.

Respectfully submitted,

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Palo Alto, California
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